

(3) Remarks

Claims 1-12 are now present in the application.

No claims have been added or canceled.

Information Disclosure Statement

The examiner has indicated that an Information Disclosure Statement is required, apparently for CH 574023; however, this reference is for background only and is to set the context of the invention and has no materiality toward the claimed invention. Moreover, the reference was cited *as background* in the PCT/ISA/210, which formed part of the PCT publication and accompanied the copy of that submitted by applicant upon filing and was also identified in the Written Opinion (PCT/ISA/237), which was also filed with this application. Accordingly, no Information Disclosure Statement is required.

Drawings

The examiner has indicated that new drawings are required because none were submitted with the filing; however, the drawings formed a part of the PCT publication and accompanied the copy of that submitted by applicant upon filing. Accordingly, no additional drawings are required under 37 CFR 1.495.

Specification Objection – 37 CFR 1.77(b)

The examiner objected to the specification for lacking suggested headings; however, applicant wishes to defer any amendment until allowable subject matter is indicated.

Claim Objections

Claims 1 and 11 have been objected to for reasons, which are fully addressed by the above amendments.

Claim Rejections – 35 USC §112, Second Paragraph

A number of points are asserted as indefinite in the claims, and the accompanying amendments address each of them.

Claim Rejections – 35 USC §103(a)

Claims 1 through 4 and 12 stand rejected under 35 U.S.C. §103 as being unpatentable over US Patent No. 4,432,667 to Richardson. This rejection is respectfully traversed.

It will be recalled that the invention provides a method for determining the propulsion force, its eccentricity in relation to the neutral axis and/or the advance direction of a series of pipe elements, wherein a pressing device applies force to the pipe elements and the faces of fluid-filled expansion elements arranged in the joints between the pipe elements. The invention enables controlling the propulsion force, including its eccentricity and advance direction. The invention enables controlling the advance of the pipe elements along an intended path and permits anomalies to be identified and corrected. Thus, the invention has applicability to heavy-duty pipe (using its strength to transmit the advancing force) and to laying pipe along curved paths.

The device and method of Richardson are very different in structure and function.

Richardson relates to the installation of *tunnel linings* including shaft linings and underground pipelines (col. 1, l. 5-8), which are moved in a perichaetial (*i.e.*, worm-like) movement.

Richardson achieves this by arranging an assembly of monolithic tunnel lining sections in end to end relationship and longitudinally advancing them with worm-like movement by sequentially inflating and deflating expandable torus members 22 interposed between the lining sections (col. 1, l. 30-38). Richardson does not employ a pressing device or measure the pressure it exerts or the deformation of joints between pipe elements as is presently claimed. It also does not calculate eccentricity or propulsion force provided by the pressing device to provide situational awareness or directional control of the propulsion.

Robinson does not measure as claimed and the only steering he can provide is from hydraulic rams in a special lead section 50 wherein suitable adjustment of hydraulic rams 60, makes it possible to alter the plane of the thrust ring 62. This imparts a steering effect, which is very different than that claimed and requires a specially-configured section 50 (Fig. 11, col. 7, l. 23-26).

The Robinson tunnel lining assembly includes a series of tunnel lining sections 12-1 to 12-8, wherein section 12-1 is a lead section fitted with a cutting edge 14 (Fig. 1, col. 3, l. 38-40). The space between the sections 12 is occupied by a respective inflatable torus 22-1 to 22-7 having a fluid inlet 24 through which compressed air may be admitted to and exhausted from the torus (Fig. 1, col. 3, l. 50-55).

The inlet 24 of the torus 22-1 and every succeeding third junction are connected to a first compressed air main 26-1; similarly other tori are connected to a second and third compressed air main 26-2, 26-3 (Fig. 1, col. 3, l. 60-67). Each main is connected to a source of compressed air and to atmosphere through a respective 3-way valve 27-1, 27-2, 27-3 (Fig. 1, col. 3, l. 68 – col. 4, l. 2).

The different nature of the forward motion and the steering apparatus from that claimed can be seen from a comparison of Figs. 1 and of 11 of Robinson, directly below to Figs. 1 and 9 of the invention, shown below those of Robinson.

Robinson

Fig. 1

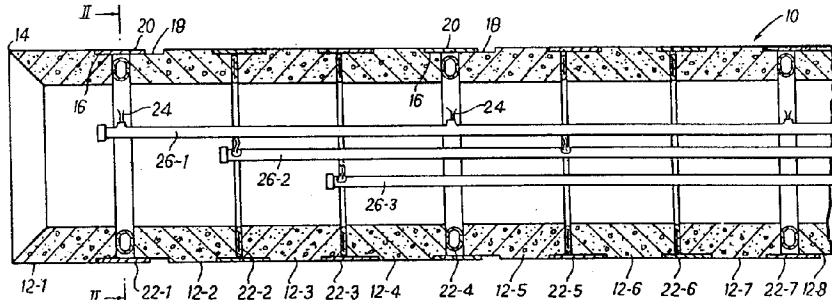
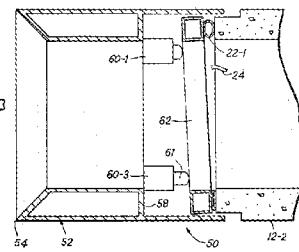


Fig. 11



The present invention:

Fig. 1

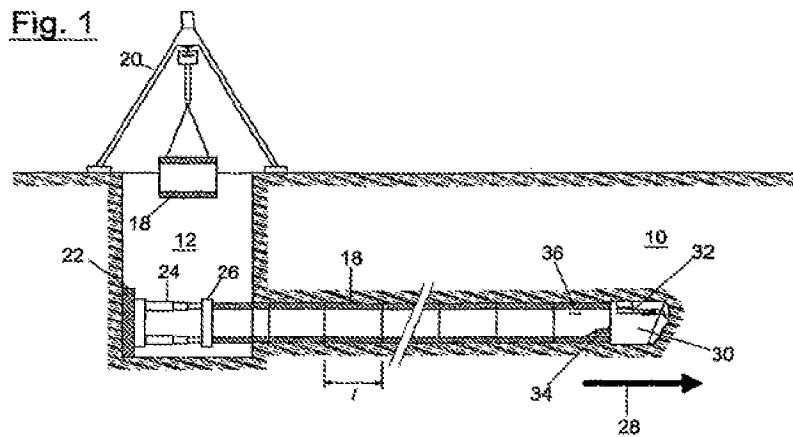
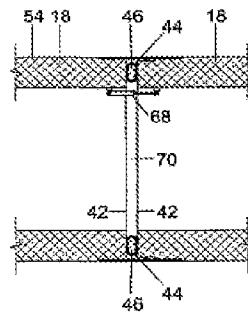


Fig. 9



In sharp distinction to present the invention, Robinson does not measure the fluid pressure and/or the deformation of the joints, and the propulsion force and eccentricity are not calculated, stored, or compared with standard values form these parameters (claim 1). Moreover, the values are not converted

into control commands for the pressing device and/or fluid supply or discharge from expansion elements (claim 2).

The examiner acknowledges that Richardson does not expressly teach the step of measuring parameters and use of the same for controlling the propulsion force. However, the examiner is of the opinion that it would have been obvious to modify Richardson's method to include measuring and controlling in order to provide for the automation of activity to replace manual activity.

Applicant respectfully disagrees with the examiner's opinion. Richardson relates to adjusting hydraulic rams in order to provide for a steering effect, wherein the hydraulic rams are arranged between the cutting edge and the first section. Contrary to that, the invention relates to controlling a pressing device and/or the individual fluid supply/discharge of the expansion elements.

Starting from Richardson, it is not obvious for a skilled person to arrive to the invention for the following reasons:

1. Unlike Richardson, in the invention the fluid pressure and/or the deformation of the joints are measured in order to calculate the propulsion force and eccentricity.
2. This difference has the effect that advance-velocity or advance-direction is known during the propulsion of the pipe elements and that action can be taken when a difference from a reference value is detected.
3. The problem to be solved by the invention is therefore to monitor the propulsion of the pipe elements.
4. Richardson does not disclose any monitoring of the propulsion of pipe elements and a person skilled in the art cannot find any guidance in order to arrive to the solution according to the invention. If a person skilled in the art would have had to find a solution to monitoring the propulsion of pipe elements, commonly accepted optical devices would have been applied, *e.g.*, a theodolite or a laser. However, it does not belong to ordinary skill to monitor the propulsion of the pipe elements by measuring pressure and/or deformation of the joints between the pipe elements.
5. Robinson requires a special end section 50 for control, and elimination of the section without eliminating its function would not have been obvious to the person skilled in the art at the time the invention was made. This fully modifies the method of operation proposed by Robinson without

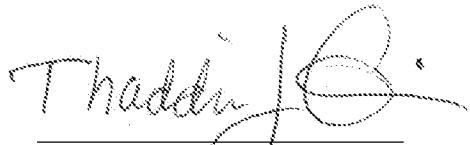
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motivation for doing such. It is submitted that the above rejection should be withdrawn in the absence of any reference illustrating a measurement and control system similar to applicant's along with a rationale that would explain the reason behind such a modification of Robinson.

Hence, the invention is neither obvious with respect to the documents of the state of the art nor does it only involve routine skill in the art in order to arrive to the invention.

Applicant has endeavored to place the application in condition for allowance, but if for any reason the examiner sees need for formal changes, she is invited to call the undersigned. Accordingly, reconsideration and allowance of all claims are believed in order and are requested.

Respectfully submitted,



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